Title:	**UC Berkeley Seismic Vulnerability Study – Berkeley, CA**	
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Hazard examined:	Earthquakes	
Study emphasis:	Risk management and recovery strategies.	
Summary:	Offers a loss estimation methodology, based upon three separate categories of earthquakes, useful in determining the degree of destruction and expected losses in dollars to university structures and contents, including anticipated downtimes for buildings and corresponding economic impacts (to both the university and the surrounding community).	

Vulnerability Indicators: structural collapse, nonstructural damage, potential deaths and injuries, serviceability after event

Economic Development, Disaster Preparedness, Disaster Response and/or Disaster Reconstruction Application: to be used for risk management purposes: setting priorities for structural and nonstructural retrofits, for business resumption plans, and for recovery strategies

Data Requirements: microzonation soil map; seismic-geologic hazards; ground shaking estimates; conditions of structures, nonstructural elements, and utilities; usage and occupancy data; and financial info on income streams and expenditures

Output: The UC Berkeley loss estimation produces information on the probable condition of the 114 structures on the central campus following three categories of quakes. The categories are: Occasional (50% probability of exceedance in 50 years; on any Bay Area fault); Rare (10% probability of exceedance in 50 years; on the northern Hayward fault); and Very Rare (5% probability of exceedance in 50 years; on the northern Hayward). It produces information on the expected losses in dollars to structures and contents. It yields estimates of expected downtimes for buildings, and the corresponding economic impacts (to the university and the community surrounding the university) of short and long-term closures of all or part of the university.

Results of Application at Case Study Site:

1) conservative estimates for repairs and replacements (structures and contents) range from $600 million to $2.6 billion, depending on the severity of the quake.

2) In a Rare quake, 40%-60% of campus space would be damaged enough that 20 months or more would be required for repair and reopening.
3) The damages would be structural and nonstructural
4) The impact of university closure would be significant on Berkeley economy, but less marked in the total Bay Area.
5) Interruption of research would have deleterious effects on current projects and on prospects for future funding.

Lessons Learned:

A) Beyond the obvious vulnerability of buildings rated "poor" or "very poor," structures rated "fair" could incur significant structural and nonstructural damage, and be closed for lengthy periods
B) 75% of research funds ($400 million/year) are spent on projects in only 17 buildings on the main campus, many of which range from "very poor" to "fair." This indicates a concentrated vulnerability of research.
C) One-third of the replacement value of the campus is in contents (books, art, anthropology artifacts, research materials, highly technical equipment, and computers). Serviceability after a quake will involve repairing or quickly replacing materials, equipment, and computers.
D) Obviously, retrofitting buildings for life safety will not guarantee their functionality after a quake.
E) Similarly, structural retrofits that pay no heed to nonstructural hazards guarantee neither 1) life safety when there are nonstructural damages, nor 2) functionality following an earthquake
F) Retrofit priorities should change in light of A&B, especially, above.
G) Business resumption planning is critically important to the ongoing operations of the university following a quake.